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A NEW TOWNSEND'S MOLE (INSECTIVORA: TALPIDAE) FROM THE STATE OF WASHINGTON

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Little taxonomic attention has been afforded *Scapanus townsendii* since Jackson's (1915) review of the North American Talpidae. Examination of 617 specimens of *S. townsendii* from approximately 186 localities throughout the range of the species has revealed the existence of an undescribed subspecies from the Olympic Mountains of Washington, which is named and described below.

Scapanus townsendii olympicus, new subspecies

Holotype.—Adult female, skin and skull, no. 22735, Puget Sound Museum of Natural History, University of Puget Sound; from Hurricane Ridge, Olympic National Park, Clallam Co., Washington, elevation approximately 1615 meters; taken on 22 August 1972 by M. L. Johnson, original number 5468.

Paratypes.—The following specimens, all taken from the type locality, were examined in conjunction with the holotype and form the basis for the description of this new subspecies: 9♂♂, 9♀♀ (UPS 3161-3163, 3292, 4571, 5983, 7023-7025, 7795-7796, 14961-14962, 22730-22734); 1♂, 1♂ (CSUF 160-8, 171).

Description.—Individuals of this race are the smallest in the species, being approached in size only by individuals from adjacent populations to the north and east. External and cranial characteristics are typical for the species.

Comparisons.—Compared with *S. t. townsendii* to the east, west, and south, *S. t. olympicus* differs in much smaller size.

Length of hind foot, greatest length of skull, basilar length, mastoid breadth, interorbital breadth, length of maxillary toothrow, and length of palate all average less in *S. t. olympicus*. From *S. orarius*, *S. t. olympicus* differs in larger size. Table 1 compares a sample of *S. t. olympicus* with selected samples of *S. t. townsendii* and *S. orarius*.

Measurements.—Selected measurements, in millimeters, of the holotype are: total length, 197; tail length, 41; hind foot length, 24; greatest length of skull, 39.1; basilar length, 32.8; mastoid breadth, 18.8; interorbital breadth, 8.3; length of maxillary toothrow 12.9; length of palate, 17.4; width across m2-m2, 10.9; width across canines, 4.8; width of the mesopterygoid fossa, 4.4; greatest depth of skull, 10.2.

Distribution.—Known only from the Olympic Mountains, Clallam County, Washington.

Ecology.—The environment in which *S. t. olympicus* lives is distinct from that of any other population of the species in the Pacific Northwest. The plant community of the Olympic Mountains is dominated by mesic grass to tall sedge (Kuramoto and Bliss, 1970). Plant cover in the high meadows occupied by the moles is dominated by several grasses and the sedge *Carex albonigra*, with American bistort (*Polygonum bistortoides*) and subalpine lupine (*Lupinus latifolius*) also being common. Subalpine fir (*Abies lasiocarpa*) is the major tree species, occurring in clumps or dense stands at the meadow edges.

A number of species of small plants are endemic to the Olympic Mountains. Several other species occurring in the drier northeastern sector (including Hurricane Ridge) are characteristic of the arid region of eastern Washington. The former may have developed during isolation, whereas the latter species may have reached the area during drier times.

Currently, the climate of the Olympic Mountains is under a maritime influence that results in mild, wet winters and cool, dry summers. Snowfall is heavy throughout most of the year. Snow cover usually is present by late October, and melt occurs from July to August.

S. t. olympicus may be termed a "snow mole" for in an ordinary year its habitat is under snow from mid-October until late July. It thus far has been found only in subalpine meadows at 4500 to 5500 feet in elevation. At this level, it is limited to areas of deep, moist soil with heavy sod in the open meadows, cirques, and ridge tops. Its closest relative, *Scapanus townsendii townsen-*

TABLE 1.—Means and one standard error (in parentheses) for seven morphological variables in selected grouped samples of two subspecies of *Scapanus townsendii* and *S. orarius* from Washington. Sexes are listed separately, and all measurements are in millimeters.

Sex	N	Length of hind foot	Greatest length of skull	Basilar length	Mastoid breadth	Interorbital breadth	Length of maxillary toothrow	Length of palate
<i>S. t. olympicus</i> —Olympic Mountains								
Males	8	25.70 (±0.67)	39.90 (±0.32)	33.80 (±0.25)	19.10 (±0.11)	8.30 (±0.06)	12.90 (±0.13)	17.50 (±0.21)
Females	9	25.00 (±0.29)	39.20 (±0.13)	32.90 (±0.17)	18.60 (±0.11)	8.30 (±0.09)	12.80 (±0.06)	17.30 (±0.11)
<i>S. t. townsendii</i> —Olympic Peninsula								
Males	5	28.30 (±0.36)	41.70 (±0.35)	35.20 (±0.38)	19.40 (±0.23)	8.87 (±0.10)	13.40 (±0.12)	18.40 (±0.24)
Females	3	28.60 (±0.33)	42.10 (±0.47)	36.20 (±0.39)	19.90 (±0.33)	9.20 (±0.03)	13.80 (±0.12)	18.70 (±0.20)
Vicinity of Tacoma								
Males	64	27.20 (±0.16)	43.00 (±0.10)	36.70 (±0.09)	20.10 (±0.06)	9.10 (±0.03)	13.80 (±0.04)	19.10 (±0.06)
Females	39	25.80 (±0.40)	41.70 (±0.14)	35.50 (±0.16)	19.60 (±0.08)	8.90 (±0.04)	13.60 (±0.07)	18.60 (±0.08)
<i>S. orarius</i> —Northwestern Washington								
Males	5	21.00 (±1.22)	33.56 (±0.21)	28.56 (±0.23)	15.92 (±0.11)	8.10 (±0.04)	10.38 (±0.09)	14.30 (±0.09)
Females	8	20.50 (±0.67)	33.21 (±0.29)	27.86 (±0.34)	16.08 (±0.12)	7.91 (±0.09)	10.34 (±0.11)	14.01 (±0.15)

dii, is a lowland animal seldom found above 2000 feet; in this lower elevation it is restricted to moist meadows and bottomlands. Between the subalpine habitat and the low meadows there is a zone of heavy forest with little underbrush, steep well-drained hillsides, thin rocky soil, and cliffs that are judged uninhabitable by either subspecies. There are a few corridors of moisture along a few streams from the high country into the valleys. Even these must be considered tenuous, however, for rocky stream beds and frequent waterfalls provide little suitable habitat for dispersal, let alone for establishment of populations.

Other burrowing mammals are found in association with *S. t. olympicus*: the congener *Scapanus orarius* occurs sympatrically with it and may be caught in the same meadow. *S. orarius*, however, is less restricted and can be found throughout the forest at intermediate altitudes, occurring sparsely into the subalpine zone in numerous areas of both the Cascade and Olympic mountains. Semifossorial species, such as *Marmota olympus*, *Microtus oregoni*, and *Microtus townsendi*, also occur sympatrically with *S. t.*

olympicus in a few areas. The pocket gopher, *Thomomys melanops*, is not present at the same localities as *S. t. olympicus*.

Remarks.—This race appears to be restricted to the higher elevations of Hurricane Ridge in the Olympic Mountains, entirely within the confines of Olympic National Park. Individuals are the smallest in the species, being approached in size only by those of adjacent populations to the north and east. Intergradation with *S. t. townsendii*, if it occurs, would be restricted to areas to the north and east of the range of *olympicus*. Specimens from Port Angeles are intermediate in many characteristics between the subspecies *olympicus* and *townsendii*, but are referred to the latter because more characters are in agreement with those of that subspecies.

For the present, this taxon is included as a subspecies of *Scapanus townsendii*. It is, however, distinct morphologically and ecologically from other populations of that species. It may well be judged a full species when additional information on chromosomal and biochemical characters, distribution and possible hybridization at intermediate altitudes, and other features become available.

Specimens examined.—Specimens examined are listed by subspecies, the number in parentheses being the total for that taxon. States and counties are arranged alphabetically, and the number of specimens for each locality precedes the institution housing these specimens. Institutions are identified by the following abbreviations (Choate and Genoways, 1975): AMNH, American Museum of Natural History, New York; CAS, California Academy of Sciences, San Francisco; CSUF, California State University, Fresno; FMNH, Field Museum of Natural History, Chicago; KU, The University of Kansas Museum of Natural History, Lawrence; MHP, Fort Hays State University, Hays, Kansas; MSU, The Museum Michigan State University, East Lansing; MVZ, Museum of Vertebrate Zoology, University of California, Berkeley; NMC, National Museum of Natural Sciences of Canada, Ottawa; OSMNH, Oregon State University Museum of Natural History, Corvallis; OSUWC, Oregon State University Wildlife Collection, Corvallis; ROM, Royal Ontario Museum, Toronto; SDSNH, San Diego Natural History Museum; TTU, The Museum, Texas Tech University, Lubbock; UBC, University of British Columbia, Vancouver; UI, University of Idaho, Moscow; UMMZ, University of Michigan, Museum of Zoology, Ann Arbor; UPS, University of Puget Sound, Tacoma, Washington; USNM, National Museum of Natural History, Washington.

S. t. olympicus (21).—WASHINGTON: *Clallam Co.*: Hurricane Ridge, Olympic National Park, 19 (UPS), 2 (CSUF). *S. t. townsendii* (590).—BRITISH COLUMBIA: Huntingdon, 4 (NMC), 12 (UBC), 1 (ROM). CALIFORNIA: *Del Norte Co.*: Crescent City, 3 (FMNH), 2 (USNM); Smith River, 3 (USNM); *Humboldt Co.*: Carlotta, 1 (MVZ); Coyote Park, 3 (MVZ); Ferndale, 11 (MVZ). OREGON: *Benton Co.*: Alsea, 1 (OSMNH); 9 mi. E Alsea, 7 (TTU); Corvallis, 8 (OSUWC), 1 (UMMZ); 1 mi. S, 1 mi. W Corvallis, 1 (OSUWC); 6 mi. N, 3 mi. W Corvallis, 1 (OSUWC); 8 mi. N Corvallis, 4 (UPS); 3 mi. N Corvallis, 2 (OSMNH); 2 mi. W Corvallis, 4 (OSMNH); 1 mi. W Corvallis, 6 (OSMNH); 1 mi. NW Corvallis, 1 (OSMNH); 5

mi. N Corvallis, 1 (OSMNH); 1 mi. S Corvallis, 1 (OSMNH); 0.5 mi. W Corvallis, 1 (OSMNH); Mary's Peak, 1 (OSMNH); 5 mi. SW Philomath, 2 (USNM); 10 mi. S, 8 mi. E Philomath, 2 (OSUWC); *Clackamas Co.*: Clackamas, 1 (UPS); Jennings Lodge, 1 (UMMZ), 1 (ROM), 12 (UPS), 11 (SDSNH), 6 (OSUWC); Milwaukie, 5 (UPS); Mulino, 1 (UPS), 6 (OSUWC); Oregon City, 3 (USNM), 2 (MSU); Oswego, 1 (MVZ), 1 (USNM); Wilsonville, 8 (SDSNH); *Clatsop Co.*: 7.5 mi. S Cannon Beach, 1 (MVZ); Old Fort Clatsop, 2 (MVZ); *Coos Co.*: 2 mi. E Bandon, 3 (UPS); 1 mi. S Bandon, 8 (UPS); 13 mi. S Bandon, 1 (UPS); Coquille, 1 (USNM), 1 (OSMNH); 9 mi. NE Coquille, 3 (UPS); *Curry Co.*: Gold Beach, 1 (USNM), 1 (FMNH), 2 (OSUWC); 1 mi. S Pistol River, 2 (MVZ); *Douglas Co.*: 1.5 mi. W Roseburg, 1 (OSMNH); Scottsburg, 1 (OSUWC); 0.5 mi. W Sutherlin, 1 (OSUWC); *Josephine Co.*: 3 mi. NE Grants Pass, 1 (USNM); 3.5 mi. W Grants Pass, 1 (OSUWC); *Lane Co.*: Ada, 1 (OSMNH); Coburg, 1 (MVZ); Eugene, 2 (OSUWC); 10 mi. W Junction City, 4 (UPS); 11 mi. W Junction City, 1 (UPS); Mercer Lake, 2 (OSMNH), 1 (OSUWC); 3 mi. E Veneta, 2 (TTU); *Lincoln Co.*: Cascade Head Experimental Forest, 7 (UPS); Fall Creek, 1 (OSUWC); Roselodge, 1 (UPS); Waldport, 1 (OSUWC); *Linn Co.*: 9 mi. SW Albany, 1 (OSMNH); 2.5 mi. S, 2 mi. E. Halsey, 1 (OSUWC); 5 mi. W Lebanon, 1 (OSUWC); 1.5 mi. S, 1 mi. E Shedd, 1 (OSUWC); 3.5 mi. S, 7 mi. W Shedd, 3 (OSUWC); 0.5 mi. E Sweethome, 1 (OSUWC); *Marion Co.*: Salem, 1 (USNM), 1 (MVZ), 1 (OSUWC); 0.5 mi. N, 2.5 mi. E Stayton, 1 (OSUWC); 6 mi. N, 3 mi. E Stayton, 1 (OSUWC); Woodburn, 3 (UPS); *Multnomah Co.*: 3 mi. ESE Gresham, 1 (OSMNH); Government Island, 1 (OSUWC); Portland, 5 (MVZ), 10 (UPS), 2 (OSUWC), 1 (ROM), 14 (AMNH), 6 (SDSNH); *Polk Co.*: Falls City, 1 (OSUWC); 5 mi. S, 1 mi. E Independence, 2 (OSUWC); 2 mi. S, 1 mi. E Monmouth, 1 (OSUWC); 0.5 mi. S, 3 mi. E Rickreall, 1 (OSUWC); *Tillamook Co.*: Beaver, 1 (ROM), 1 (OSUWC); Blaine, 2 (UMMZ), 2 (OSMNH), 2 (MVZ), 2 (ROM); Hebo Lake, 1 (OSMNH); Mount Hebo, 1 (OSMNH); 1 mi. SW Nehalem, 2 (OSMNH), 2 (UPS); Netarts, 2 (OSUWC), 1 (USNM); 9 mi. SW Pleasant Valley, 2 (OSUWC), 1 (USNM); 9 mi. SW Pleasant Valley, 2 (UM); Tillamook, 2 (CAS), 2 (MVZ), 1 (OSUWC), 8 (OSMNH), 2 (UPS), 1 (UMMZ), 1 (USNM); 2 mi. SE Tillamook, 1 (OSUWC); 1 mi. S Tillamook, 2 (OSUWC); 2 mi. W Tillamook, 1 (UPS); 9 mi. S Tillamook, 2 (UMMZ); *Washington Co.*: Beaverton, 1 (USNM); Cedar Mill, 1 (UPS); 18.5 mi. NW Portland, 1 (MVZ); Tigard, 1 (OSUWC); *Yamhill Co.*: 3 mi. E Newberg, 5 (MVZ). WASHINGTON: *Clark Co.*: 1.5 mi. E, 1 mi. N Amboy, 3 (MVZ); 1 mi. S, 2 mi. W Camas, 1 (OSUWC); Vancouver, 11 (USNM); *Clallam Co.*: Clallam Bay, 2 (USNM); Elwha River forest service camp, Olympic National Park, 1 (UPS); Elwha Ranger Station, Olympic National Park, 1 (UPS); Forks, 1 (USNM); La Push, 3 (USNM); Olympic Peninsula, 5 (UPS); Port Angeles, 3 (UPS), 1 (CSUF), 1 (USNM); Sequim, 1 (USNM); *Cowlitz Co.*: mouth of Kalama River, 2 (MVZ); 3 mi. NW Woodland, 1 (UPS); 2.5 mi. S Woodland, 1 (UPS); *Gray's Harbor Co.*: Norwood, 1 (USNM); *Jefferson Co.*: Hoh River, 3 (UMMZ); Port Townsend, 4 (USNM); Queets River, 1 (UPS); *King Co.*: 1.5 mi. E Bellevue, 1 (MVZ); Bothell, 2 (UI); 2 mi. E, 4 mi. N Enumclaw, 1 (MHIP); headwater of Green River 2 (UPS); 3 mi. E Kent, 1 (MHIP); Renton, 1 (MVZ); Seattle, 2 (UPS), 1 (MVZ); *Levy Co.*: Chehalis, 1 (UPS); 8 mi. W Chehalis, 5 (USNM); *Mason Co.*: Lake Cushman, 1 (UMMZ), 2 (USNM); Portlatch, 1 (UI); Shelton, 1 (USNM), 3 (UPS); 5 mi. S Shelton, 4 (UPS); Union, 1 (UPS); *Pacific Co.*: 1.5 mi. N Chinook, 1 (MVZ); 2.5 mi. N Chinook, 1 (MVZ); Ilwaco, 1 (USNM); South Bend, 6 (USNM); *Pierce Co.*: Arletta, 1 (UPS); Bonney Lake, 1 (UPS); Gravelly Lake, 1 (UPS); Horsehead Bay, 5 (UPS); Key Center, 9 (UPS); McKenna, 3 (UMMZ); Parkland, 6 (UMMZ), 1 (MSU), 1

(UPS); Puyallup, 101 (USNM); Steilacoom, 1 (USNM); 5 mi. S Tacoma, 4 (TTU), 22 (UPS); 1 mi. S Yelm, 1 (UPS); *Skamania Co.*: Skamania, 1 (USNM); *Shohomish Co.*: Shohomish, 1 (USNM); East Stanwood, 2 (MHP); Rockport, 3 (USNM); *Thurston Co.*: Olympia, 4 (USNM), 3 (UPS); 7 mi. W Olympia, 1 (UPS); 9 mi. W Olympia, 1 (UPS); Tenino, 3 (USNM); 2.1 mi. N, 3.6 mi. E Tenino, 1 (UPS); *Wahkiakum Co.*: Cathlamet, 2 (USNM), 1 (UPS); 4 mi. E Skamokawa, 2 (MVZ).

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